ENERGY TECHNOLOGY DYNAMICS FROM ENERGY NEWSDATA

ENERGY PROSPECTS

Executive Summary

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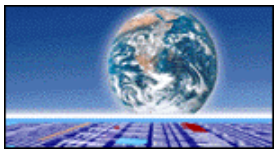

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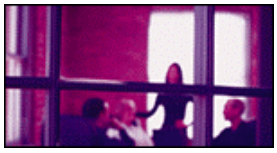

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Wind Power Looks Better and Better

Wind power is finally reaching maturity, says KWEA head @ 12].

1] Mass. DG Ready to Bloom

Following what has been called a "contentious proceeding" concerning the influence of stand-by rates over distributed generation growth in eastern Massachusetts, NSTAR Electric and a number of industry and environment advocates last week reached a settlement that supporters say will provide fertile ground for renewable energy and DG to blossom in the state.

NSTAR, which provides power to nearly 1.4 million customers in Boston and its surrounding areas, initially submitted its proposed stand-by rates to the state's Department of Telecommunications and Energy (DTE) in October 2003. But in March 2004 a collection of interveners, including the Conservation Law Foundation (CLF) and a coalition of DG interests known as the Joint Supporters, contested the tariffs.

Seth Kaplan, CLF's clean energy and climate change program director, told *Prospects* that the entire NSTAR proceeding leading up to the settlement was "largely an exercise in damage control to head off stand-by rates that we viewed as quite dangerous to the future of distributed generation." Kaplan also called the settlement "a big win for renewable energy technologies."

Under terms of the agreement, self-generation in NSTAR's service territory derived from state-defined renewable energy sources such as wind and solar power will be exempt from the company's stand-by rates. Though the settlement also exempts all DG units under 250 kW, as well as on-site generation that provides up to 30 percent of load from units between 250 kW and 1 MW, Kaplan said the renewable energy condition will help fulfill one of CLF's primary goals: to ensure that "letting a hundred DG flowers bloom" does not equate to allowing "a hundred diesels [to] plume."

Kaplan added that stand-by rates will still apply for larger DG units, including combined-heat-and-power applications, though he said that due to the settlement, those rates are now far less—in some instances up to 20 percent less—than those initially proposed by NSTAR. He said that the new stand-by rates, while still significant, would "reduce substantially the negative impact" the tariffs will have on larger-sized units. The settlement also extends activation of stand-by connection rates to Dec. 31, 2004; NSTAR originally proposed that the tariffs commence on Aug. 1, 2004.

Chris Young of The E Cubed Company, LLC, a group representing the Joint Supporters, said that while most settling parties agreed that terms of the settlement were not perfect, the accord reached was most likely better than any potential decision that could have been handed down by the DTE. Young stressed that the settlement, which he called "a reasonable compromise," will now provide certainty for the DG and CHP industry to move forward and also grow throughout eastern Massachusetts.

One of the primary beneficiaries of the agreement will be the Boston Public Schools, he said. The BPS is a member of the Joint Supporters coalition and is actively "embracing CHP," Young noted. He added that the settlement specifically exempts a good number of CHP units that are above 250 kW from stand-by rates in certain public school facilities.

NSTAR spokesman Mike Durand also voiced satisfaction over terms of the agreement. He said that the settlement, now awaiting final approval from the DTE, strikes a strong balance between encouraging DG and renewable energy and also ensuring that additional integration costs are absorbed fairly. "[NSTAR has] long been well aware of the benefits of distributed generation to our region. Though our primary concern is and was that our residential and small business customers throughout our service area do not have to shoulder the financial burden of other customers' [DG] units," Durand told *Prospects*. ***[Joel Puglisi]***

"Letting a hundred DG flowers bloom" does not equate to allowing "a hundred diesels [to] plume."

More information:
NSTAR (www.nstaronline.com)
MDTE (www.mass.gov/dte/)
CLF (www.clf.org)
E Cubed (www.ecubedllc.com)

2] High Commercial Appeal for BPL

Search online for a definition of "killer app" and you'll find a brief history lesson of how a software slang term for "the next big thing" migrated from PC jargon to Internet jargon. It may again migrate to electric utilities as interest in offering broadband over power lines (BPL) grows.

More than a third of Internet-connected households say they would switch to the higher speeds and extra features offered by BPL at the same or lower prices than their current provider, according to a new national study. Interest in switching was especially strong among cable and dial-up users. BPL also offers the ability to send larger e-mail attachments, which was the most important "must have" for Internet service among the survey's respondents. While the market is a long way from "locked up," the study concludes, consumers could be successfully swayed by emphasis on higher speeds, customer service and comparable prices.

The study was conducted on 250 Internet-connected households nationwide by market research and polling firm RKS Research & Consulting and energy and telecommunications consultant Barrington-Wellesley Group. Half of the respondents live in urban or suburban areas and half are from rural areas, and 100 use dial-up connections, with the remainder split between DSL and cable.

Four out of 10 customers in the RKS survey expect the need for higher connection speeds to increase in the next year. BPL technology already offers competitive download speeds and faster upload speeds than cable and DSL, while improvements are on the rise. One BPL technology developer, Amperion, which has American

Electric Power and Cisco Systems among its investors, announced in May a new generation of products that provides higher speeds and increased compatibility with more utility systems than its existing product line, which is deployed in pilots in PPL, Progress Energy, Southern Company and Idacorp utility territories. The "Amperion Connect" system uses a combination of BPL and wireless technology, transmitting data along power lines into a neighborhood and then sending it wirelessly into several homes or businesses at once.

Aside from the additional revenue utilities could glean from their existing infrastructure, BPL opens the door to enhanced utility services like outage alerts, remote meter reading and eventually home energy management networks. The New York State Energy Research and Development Authority announced funding this month for just such a trial with technology developer Ambient and utility Con Edison. As an enhancement of an existing trial, new capabilities will be installed on two distribution circuits to allow Con Edison to monitor general circuit health, power quality, outage management and response, and automated meter reading.

The incremental revenue stream from BPL would not be free money, however. For each neighborhood served by BPL, the utility must install an "injector," which connects the substation to the Internet and sends the data down the medium- and low-voltage feeder lines. Periodically along the lines, "repeaters" are required to decode, strengthen, re-code and re-send the signal so it doesn't get lost or distorted. At the end, an "extractor" is required to pull the data off the power lines and send it to the computer. This hardware adds to installation and operating and maintenance costs, on top of the added customer service and tech support needs associated with adding the service.

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BPL has been touted as a way to get high speed Internet access to rural areas, although critics question this claim, arguing that the more rural the area, the more repeaters will have to be installed on the power lines to strengthen the signal—which will increase costs. Washington state's Chelan County PUD began a trial last month that could help resolve this issue.

The utility is testing two broadband technologies—wireless and BPL—in two separate areas where residents won't have access to the fiber-optic network for some time because of their remote location or sparse population. The two-month trial will provide information on deployment and maintenance costs, performance and functionality, and will help the utility determine which, if any, technology would be feasible for a deployment.

Cinergy Corp. also announced a joint venture in March with Current Communications Group, a BPL provider, to target BPL deployment in municipal utilities and rural electric cooperatives. At the same time, the companies began offering BPL commercially in the greater Cincinnati, Ohio, area [see **Cinergy Pioneers Web Service**, March 26, 2004]. According to the RKS study, an interest in BPL was even higher among urban and suburban Internet users than among rural users. Two-thirds of the urbanites indicated interest, versus half of rural dwellers.

Urban interest continues to grow. The city of Seattle, Wash., recently announced that it will explore the feasibility of becoming an Internet wholesaler, and will consider BPL as one potential option. Atlanta, Ga.'s LecStar Telecom has signed a deal with its local electric utility for a six-month, 30-customer trial in which about six customers will get to test Voice over Internet Protocol services in combination with BPL. ***[Ben Gilbert]***

More information:
RKS Research (www.rksresearch.com)
Barrington-Wellesley Group (www.bwgi.com)
Amperion (www.amperion.com)
Ambient Corporation (www.ambientcorp.com)
NYSERDA (www.nyserda.org)

3] Twice as Nice: DTE's Hydrogen Park

DTE Energy earlier this week broke ground on its Hydrogen Technology Park at Detroit Edison's Southfield Station in Michigan. The diversified energy company says that its demonstration project, sponsored in part by the U.S. Department of Energy, will be the first of its kind to integrate renewable energy into an "end-to-end hydrogen energy station," as it will use solar and biomass power to produce hydrogen for both electrical on-peak generation and onsite vehicle fueling.

The "complete renewable hydrogen system" will produce hydrogen via a 170-kW electrolyzer, using tap water from the city's water supply, and will also take advantage of DTE's existing renewable energy infrastructure and know-how, spokesman Scott Simons told *Prospects*. Simons noted that DTE already possesses a 25-kW photovoltaic system (initially used in the company's Solar Currents program) at the project site, and added that two of its subsidiaries, DTE Biomass Energy and DTE Energy Technologies, also give the company an "economic advantage" in developing the project. "We already have the technology and experience," he said. A portion of the power needed to generate hydrogen will also be supplied from the central power supply of subsidiary Detroit Edison during low-cost, off-peak hours.

DTE says that its hydrogen park, which will employ a stationary, 50-kW PEM fuel cell bank, will be capable of generating approximately 100,000 kWh of electricity per year. Simons said the entirety of this power would be exported to the grid, though added that DTE was exploring the potential of using a portion of the electricity to power a future visitor center at the park.

Initially sponsored by DOE in 2002 to examine hydrogen's role in electric generation, DTE's hydrogen park received supplemental federal funding in April to also study the co-development of fuel cell vehicles and a corresponding hydrogen infrastructure. Partnering with DaimlerChrysler and BP America through DOE's "Hydrogen to the Highways" program, DTE says its project will generate enough compressed hydrogen gas to fuel three fuel cell vehicles per day. The site will house a compressed gas storage facility along with a 5,000-psi vehicle refueling station.

As the project is expected to provide information to help overcome both the technical and economic hurdles of hydrogen commercialization, DOE notes that co-production for electric generation and onsite vehicle fueling will reduce the footprint and cost of hydrogen-based energy systems, and also mitigate their execution risks. DOE adds that the hydrogen park will also help develop relevant safety standards and codes required for commercialization, evaluate the peak-shaving and scaling potential of hydrogen power parks, and study the cost-competitiveness of hydrogen production through electrolysis.

DOE notes that co-production for electric generation and onsite vehicle fueling will reduce the footprint and cost of hydrogen-based energy systems.

DTE's Simons said that many components of the hydrogen park have already been installed, and added that the remaining elements, including the fuel cell bank and hydrogen storage facility, will be integrated later this summer. By autumn, DTE's hydrogen park will be exporting electricity to the grid and powering fuel cell vehicles via hydrogen, he said. ***[J.P.]***

More information:
DTE Energy (www.dteenergy.com)
DOE Hydrogen, Fuel Cells & Infrastructure Technologies Program (www.eere.energy.gov/hydrogenandfuelcells/)

4] Innovators Showcase Energy Future

Twelve of the most promising new energy technology companies in the Pacific Northwest and Western Canada will present their products next month at the Northwest Energy Technology Collaborative's first annual Northwest Energy Technology Showcase in Victoria, British Columbia.

Among the most mature companies presenting at the July 13 event are combined heat and power specialist Mariah Energy Corp. of Calgary, Alberta; fuel cell developer ReliOn, based in Spokane, Wash., one of the few fuel cell companies in the world with commercially available products; and Seattle-based 3TIER Environmental Forecast Group, the largest wind energy forecaster in the United States.

Mariah Energy, which has delivered 31 Capstone-manufactured microturbines integrated with its own heat-exchange technology, is introducing its 91 kW thermal, 55-kW electrical CHP system built on Stirling cycle engine technology. The company plans to market the system for landfill and wastewater treatment applications at $63,000.

3TIER Environmental Forecast Group, a provider of renewable resource forecasting and risk assessment, has seen its business grow in step with the expansion of wind power in the United States, and may also soon benefit from more robust growth projected in Canada.

The company recently helped Puget Sound Energy narrow the field of potential wind energy projects bidding to supply power to the Bellevue, Wash., utility, which has several active requests for power. In an indication of wind power's increasingly competitive prices, several of these projects are currently among the finalists in PSE's all-source RFP.

3TIER is forecasting more than 1,000 MW of wind in the United States, and another 2,000 MW of hydroelectric, company president Pascal Storck told *Prospects*.

Companies such as In PowerSoft, PCS UtiliData, Serveron Corp. and Tantalus Systems, in addition to the Pacific Northwest National Laboratory, will present technologies reflective of the region's increasing application of its software and communications expertise to the utility sector.

Avista Utilities of Spokane, Wash., recently commissioned a $380,000 PCS UtiliData distribution automation system, called AdaptiVolt, at an urban substation. AdaptiVolt promises to purge needless volts at the feeder source without causing low-voltage events. It represents the fifth deployment of the product, and the first on heavily loaded urban feeders.

According to PCS UtiliData President Tom Wilson, on distribution feeders where AdaptiVolt reduces voltage on average to 118.8 volts from 121.6 volts, tests show a reduction in energy use of up to 2.5 percent, and a 3.8 percent reduction in peak load [see **NW Utilities Seek Voltage Sweet Spot** @ 6].

AquaEnergy Group, a developer of wave energy conversion technology based on Mercer Island, Wash.; WestTech Energy, a Kelowna, British Columbia, developer of low-speed horizontal- and vertical-axis wind turbines; and two Vancouver, BC-based biomass energy innovators, Heuristic Engineering and Lignol Innovations Corp., will also present.

WestTech Energy is in search of some C$4 million in investment to lift several of the company's turbines now nearly fully developed to commercialization, said company president and chief executive officer Richard West [see **Low-Speed Turbines to Open Up New Areas for Wind** @ 20].

All of the early- to mid-stage companies presenting at the technology showcase are seeking to take their products to the next level, whether that means finding investment to debut new product lines or expanding into new markets. A NWETC event on July 14, the EnVenture Northwest Boot Camp, will give companies an opportunity to present to regional energy venture capital firms.

Jeff Morris, director of the Northwest Energy Technology Collaborative and a Washington state legislator,

said he hopes the event helps generate early revenues for these companies. NWETC plans to present an early adopter award at next year's event to the company, or companies, acquiring products featured this year. ***[Garrett Hering]***

More information:
Northwest Energy Technology Collaborative (www.nwetc.com)

5] Turning Unconventional in Alberta

Conventional oil and gas production may have peaked in Alberta three years ago, but the province's energy potential remains largely untouched, the annual report by the Alberta Energy and Utilities Board reveals. Natural gas production is expected to continually decline in the coming years, but little data exists on coalbed methane potential, which could make up some of the difference. Crude bitumen (or oil sands) production last year already exceeded conventional oil by 50 percent while barely scratching the surface of expected reserves.

"Alberta's Reserves 2003 and Supply/Demand Outlook 2004-2013" claims to be one of the most comprehensive and reliable catalogues of what is still a vast, untapped energy resource. The picture of how that resource will unfold over the next decade is one shaped by high oil and gas prices, and consequently high drilling activity and billions of dollars in planned oil sands investments.

Natural gas declined for the second year in a row, leading the EUB to conclude that production may have peaked in 2001. The province produced 4.8 trillion cubic feet last year**,** marking a 2-percent decline from 2002 in an environment in which drilling activity was up 46 percent to 12,000 successful new wells. However, those new wells yielded lower initial production and steeper depletion rates. The EUB predicts 11,000 more successful wells will be drilled this year and annually through 2013, but this intense activity will keep production flat this year, with output beginning to decline again next year at an average annual rate of 2.5 percent through 2013.

Where the capital goes could change things, however. Most of the recent drilling activity—including 54 percent of the new wells drilled last year—has been in the southeastern shallow gas region where more infrastructure exists but wells yield less. That region produced only 16 percent of output last year. EUB expects the exploration focus to shift to more productive wells in the west side of the province where most of the remaining established reserves and potential for new discoveries lie.

Coalbed methane could be the province's wild card. Unlike in the United States, where the gas potential of coal formations has been extensively studied, coalbed methane activity in Alberta has just begun to pick up in the last several years. The EUB included its first estimate of CBM reserves in the report, an admittedly conservative 35 billion cubic feet—a tiny fraction of Alberta's 40 Tcf of conventional gas reserves. But the potential is largely unstudied and the EUB expects that estimate to increase next year as new rules require the industry to gather more data. The Alberta Geological Survey last year estimated a total of 14 Tcf locked away, but how much of that is recoverable will depend on the composition of the coals.

One of Canada's largest gas producers, Petro-Canada, has taken the strategy of profiting while learning. Petro-Canada this month announced the acquisition of Prima Energy, a natural gas company with plans to double its coalbed methane development in the American Rocky Mountains by 2007. Petro-Canada plans to eventually apply the expertise it gains there to its growing holdings in Alberta and eastern British Columbia.

Alberta's gas demands are increasing, however, which means an even smaller proportion of that declining gas resource will be available for sale to the United States and other Canadian provinces, the report states. Last year the province used only 27 percent of the gas it produced, but it is predicted to need 46 percent by 2013, while producing less gas. That squeeze could leave less available for sale.

Last year the province used only 27 percent of the gas it produced, but it is predicted to need 46 percent by 2013, while producing less gas.

EUB rules require gas supply to meet the long-term needs of core customers before new gas export permits can be approved. While there is currently a surplus of electric generation, the province also recently implemented new transmission rules to accommodate an expected growth spurt [see **Pandora's Sand Box** and **Footing the Transmission Bill**, May 7, 2004]. Alberta expects an even larger growing gas need for increasing industrial activity, mainly that associated with oil sands development and refining. If the industry moves toward using bitumen gasification [see **Tapping Canada's Oil Sands**, May 21, 2004] or other low gas technologies under development for bitumen production, the report states, then the province's gas demand could decrease substantially from projections.

And the industry may do just that, given how exposed it is to gas price volatility, coupled with the enormous potential of bitumen production. Crude bitumen production, which passed conventional oil production in 2001, was at 350 million barrels last year, up 17 percent over 2002, and is expected to triple by 2013. Bitumen mining accounted for most of last year's growth. In-situ bitumen—the deeper reserves—increased modestly, but several steam-assisted gravity drainage projects have either recently been approved or are under review, paving the way for further growth in the next several years. The total crude oil reserves in the province are estimated at 176 billion barrels, 174.5 billion of which are bitumen. Only 2 percent of the initial bitumen reserves are thought to have been depleted. ***[B.G.]***

More information:
Alberta's Reserves 2003 and Supply/Demand Outlook 2004-2013 (www.eub.gov.ab.ca/BBS/new/newsrel/nr2004-20.htm)
Petro-Canada (www.petro-canada.ca)

6] NW Utilities Seek Voltage Sweet Spot

Somewhere in electricity distribution systems, there is a sweet spot where voltage going into homes or businesses can be regulated to flow at the lowest bandwidth needed for proper operation of equipment, and within levels set by regulatory agencies and standards organizations.

Such voltage regulation could spell substantial energy savings. A handful of Northwest utilities are taking part in the search for the right combination of technologies and techniques to maximize the value of their distribution systems by lowering voltage.

Avista Utilities of Spokane, Wash., recently commissioned a PCS UtiliData distribution automation technology, called AdaptiVolt, at its Francis and Cedar substation, which promises to purge needless volts at the feeder source without causing low-voltage incidents.

Wilson expects that tests will confirm generally better results for energy conservation and demand reduction with heavily loaded feeders.

The $380,000 Avista installation is the fifth regional installation of the AdaptiVolt technology. Three Clatskanie People's Utility District substations in Oregon have used the voltage reduction application for over a year and a half, and an installation at an Inland Power and Light substation north of Spokane has operated for more than two years.

According to PCS UtiliData President Tom Wilson, on distribution feeders where AdaptiVolt reduces voltage on average to 118.8 volts from 121.6 volts, tests show a reduction in energy use of up to 2.5 percent, and a 3.8 percent reduction in peak load.

"We've also seen a real reduction in reactive power," said Wilson. AdaptiVolt can reduce reactive power by up to 30 percent, he said. Reducing reactive power requirements with reduced voltage can reduce the need for capacitors on a system, and also indicates a need to coordinate kVAR control with voltage control, he added.

With urban feeders more heavily loaded in an urban setting, the installation at Avista's Francis and Cedar substation differs from the previous four. Wilson expects that tests will confirm generally better results for energy conservation and demand reduction with heavily loaded feeders.

PCS UtiliData estimates payback at under two years for an installation at an investor owned-utility urban substation with 6 feeders on a total installed cost of some $418,000. Such an installation would save 8,541,667 kilowatt-hours of electricity a year, or about $299,000 in energy savings. The company projects about a dozen more installations at substations in the next year.

With the installation in Spokane, Avista is the first of 12 utilities in the Northwest set to participate in the Northwest Energy Efficiency Alliance's Distribution Efficiency Initiative, a multi-year effort aimed at demonstrating and documenting energy savings for light commercial and residential customers through conservation voltage regulation strategies both at the substation level and the "point of consumption" level, using a "home voltage regulator" made by Seattle area-based MicroPlanet.

According to Alliance project lead Bob Helm, 500 "Home Voltage Regulators" will be installed at customer sites across the Northwest in the third quarter. MicroPlanet estimates that its units, which attach to residential meters and stabilize voltage going into the home at 114.5 volts, can reduce household energy use by as much as 20 percent.

Testing from all of the installations will help utilities in Idaho, Montana, Oregon and Washington identify whether voltage regulation at the home, the substation, or a combination of both offers the greatest energy savings. After testing, the Alliance will develop design guidelines and toolkits to assist regional electric utilities in designing distribution systems with voltage control to achieve energy savings, Helm said.

Utilities participating in the Distribution Efficiency Initiative so far include Avista Utilities, Idaho Power, Idaho Falls Power, Snohomish County PUD, Eugene Water and Electric Board, Puget Sound Energy, Clark County PUD, PacifiCorp, Hood River PUD, Skamania County PUD, Franklin County PUD and Clatskanie People's Utility District. ***[G.H.]***

More information:
MicroPlanet (www.microplanetltd.com)
NW Energy Efficiency Alliance (www.nwalliance.org)
PCS UtiliData (www.pcsutilidata.com)

7] Gateway to Demand Reduction

As a stopgap "non-wires" strategy, the Bonneville Power Administration last month launched a two-year demonstration program to use smart appliance devices in retail customers' homes to help collectively shave peak-load electrical demand. The program was started in Ashland, Ore., and related efforts are targeted for Richland, Wash., and Washington state's Olympic Peninsula region.

The direct load-control technology communicates in both directions, and links a customer's thermostat and specific appliances as well as the customers and energy companies involved. BPA has budgeted about $150,000 for the two-year Ashland pilot.

Using technology developed by London-based Invensys, 100 Ashland municipal utility department residential customers will each have a gateway connected to the Internet through a high-speed cable modem. The gateway is connected wirelessly to the thermostat, the outside house meter and remote load-control devices on electric hot-water heaters and air-conditioning units. The remote devices can also be attached to pool pumps and other large household-load appliances.

The gateway receives real-time information from the appliances and the homeowner can control appliances via the Internet. The system also allows the utility to perform load curtailments. As opposed to a normal programmable

thermostat, this demonstration system gives homeowners what BPA calls "a lot more control" over their energy use.

The remote peak-load management feature does not turn off appliances, it just bumps up the thermostat, though individual customers can decide by how many degrees, and can ultimately override the utility.

BPA hopes to piece together enough peak-shaving to see reductions in peak demand levels. Nevada Power Co. recently finished a pilot and was "very pleased" with the results, according to a BPA assessment.

"A goal of the demonstration program is to attempt to get more utilities to try direct load control for meeting some needs instead of building more transmission," said a BPA manager in the non-wires technology program.

Ashland Electricity and Telecommunications Director Dick Wanderscheid said the city hopes "to learn how effective this system is to keep [our] electric costs low while helping solve future Pacific Northwest transmission challenges." He added that the city would closely monitor costs, capacity savings and levels of customer acceptance to evaluate the potential "larger-scale implementation" of the program.

The program in Richland, Wash., conducted in conjunction with the Pacific Northwest National Laboratory, will install remotely accessible load-shedding equipment and software in two commercial buildings to determine to what extent energy can be reduced for limited periods of time in a single building. ***[Richard Nemec]***

More information:
BPA Non-Wires Solutions Update newsletter (www.transmission.bpa.gov/PlanProj/Non-Construction_Round_Table/NonWireDocs/504Newltr.pdf)

8] E-Gas! IGCC Starts to Get Legs

Like so many alternative energy technologies, hydrocarbon gasification has for decades been a promising process that has been waiting for its time to shine. Some industry experts believe that in this high gas and oil price market and environmentally sensitive regulatory climate, the ability of gasification to produce electricity, heat, transportation fuels, hydrogen and specialty chemicals from a variety of feedstocks, with low emissions, means its time is drawing near.

ConocoPhillips is readying itself to put to use the "E-Gas" gasification technology it purchased from Global Energy last summer. The company announced this month a development and technology licensing agreement with Excelsior Energy for that company's Mesaba Energy Project—a plan to build a $1 billion, 530-MW integrated gasification combined cycle power plant on the Iron Range of northeastern Minnesota that has been in the works since 2001 and is expected to be operational in 2010.

The Mesaba Energy Project will be a chance for ConocoPhillips to commercially implement upgrades to the E-Gas technology developed with the U.S. Department of Energy, such as higher efficiency and lower cost, a hybrid particulate removal system, enhanced sulfur and mercury removal and possibly an advanced combustion turbine.

Some consumer and environmental groups are skeptical of the Excelsior project, however, arguing that the relatively new, unproven, five-person company is relying too heavily on government loans and subsidies, or that the energy needs of the region should be met with renewable projects instead. ConocoPhillips officials said in a recent press release, however, that "Excelsior has assembled an experienced development team" and "is raising the bar for everyone."

E.J. Troxclair, ConocoPhillips' program manager for gasification, told *Prospects* that the E-Gas technology was chosen because of his technology team's experience with the Wabash River Coal Gasification Repowering Project in West Terre Haute, Ind., which has been in operation since 1995. This expertise will also support the bid Excelsior planned to submit this month for a $150 million DOE Clean Coal Power Initiative solicitation.

The Mesaba Energy Project will be a chance for ConocoPhillips to commercially implement upgrades to the E-Gas technology developed with the U.S. Department of Energy, such as higher efficiency and lower cost.

Cinergy Corp., which purchases synthetic gas from the Wabash facility for its adjacent power plant, announced in February that it has also begun preliminary engineering and site analysis for a 500-MW IGCC project in Indiana to replace one of its aging coal plants [see **Inquiring Shareholders Want to Know**, Feb. 27, 2004].

If the market for gasification plants gets legs, it may lend a new significance to the alliance agreement ConocoPhillips signed in May with the engineering, procurement and construction (EPC) company Fluor Corporation, intended to facilitate new E-Gas projects. One of the major hurdles to gasification development has been how capital-intense the projects are, so a partnership between a technology owner and an EPC company will be well-received in the industry, Troxclair said, and will be able to offer everything from conceptual support to turnkey facility construction.

Gasification is often thought to be the answer for removing carbon dioxide from coal power generation because the greenhouse gas can be captured before combustion of the synthesis gas. But without adding carbon capture, IGCC plants still emit less of the gas simply in proportion to their higher generating efficiencies. Troxclair estimated that IGCC plants are about 20 percent more efficient than the average subcritical coal plant, and 10 percent more efficient than the most advanced pulverized coal plant. He added that their overall emissions profile is much cleaner because pollutants are removed from the fuel during gasification. Mercury removal in the Excelsior project, for instance, will likely be in the 90-percent range, he said. ***[B.G.]***

More information:
ConocoPhillips (www.conocophillips.com)

9] Preserving Treasure from Trash

Xcel Energy last week completed tests of a sorbent material that promises to not only reduce mercury output from coal-fired plants, but also preserve the quality of fly ash left over after combustion. The sorbent, developed by Amended Silicates (a joint venture between Colorado-based ADA Technologies and CH2M Hill), could prove to be of great worth to utilities such as Xcel, which currently profit from the sale of the byproduct.

As the nation's first-ever mercury reductions regulation draws near, the coal industry has warned that today's most mature mercury control technology, activated carbon injection, can negatively impact the quality of fly ash. The U.S. Department of Energy's National Energy Technology Laboratory (NETL) notes that "because an important market for fly ash is the manufacture of concrete, any additional carbon content [resulting from activated carbon injection] may render it unsuitable for sale."

NETL adds that the loss of revenue, coupled with a resulting disposal cost, "can be substantial." According to the American Coal Ash Association (ACAA), the cost of disposal for coal utilization byproducts (CUBs) such as fly ash ranges from $3 to $30 per ton. Because revenue from CUBs typically ranges from $3 to $35 per ton, ACAA concludes that the combined potential economic benefit for CUB use can ultimately range from $6 to $65 per ton.

ADA Technologies Vice President of Operations Jim Butz observed that for utilities that generate hundreds of thousands of tons of fly ash annually, the net difference could equal millions of dollars saved. Xcel Energy, for example, currently produces roughly 2.4 million tons of coal combustion byproducts annually, according to spokesman Mark Stutz. The company utilizes about 40 percent of those byproducts, he said, earning a net revenue of approximately $2 million each year.

Bill Stark, senior environmental engineer at R.W. Beck, one group forecasting a "renewed momentum" in the development of coal plants, added that while existing technologies such as activated carbon injection can remove a high percentage of mercury, landfilling fly ash that could have otherwise been utilized will only create additional environmental problems. Expanding or opening new landfills to dispose of saleable fly ash will undoubtedly precipitate further public debate and concern over the mercury issue, he said.

"With Amended Silicates, a utility retains the ability to sell fly ash even after implementing our mercury-control technology."

Nationwide, coal-fired power plants produce nearly 118 million tons of fly ash and other combustion byproducts each year, according to NETL. The lab adds that while only 31.5 percent of these byproducts are utilized, primarily as a structural fill material, blasting grit, gypsum and a partial substitute for cement in concrete, the remaining 68.5 percent are disposed of in landfills and impoundments.

Butz told *Prospects* that while data from Xcel's Arapahoe Generating Station in Denver are still being analyzed, preliminary results "look promising." He noted that Amended Silicates' sorbent can be manufactured at roughly the same cost as activated carbon and is capable of reducing mercury emissions in many cases by up to 80 percent.

Most importantly, Butz stressed, "With Amended Silicates, a utility retains the ability to sell fly ash even after implementing our mercury-control technology. And the only capital equipment items [required] are storage for the sorbent and a simple air-conveyed injection system." For a standard 250-MW coal plant, the price for such equipment would be less than $750,000, he said. "Minimal capital investment," coupled with the ability to preserve the economic benefits associated with the sale of fly ash, Butz added, could significantly mitigate the costs of future mandated mercury-control technology. ***[J.P.]***

More information:
Xcel Energy (www.xcelenergy.com)
NETL (www.netl.doe.gov)
ACAA (www.acaa-usa.org)
ADA Technologies (www.adatech.com)
R.W. Beck (www.rwbeck.com)

10] Tehachapis Need Wind 'Pipeline'

Although California's Tehachapi Mountains are widely recognized and well regarded for their wind energy possibilities, the region has lingered in this highly visible "potential" state for more than a decade.

Even with the current state and national movement to support increased portions of renewably generated electricity, and with favorable economic, technology, and market drivers, many wind-rich geographic areas lie relatively fallow for lack of transmission lines to carry their energy to load centers. Book chapters and regulatory reports notwithstanding, tapping the full wind power potential of Tehachapis and other areas around the country will require some real bullet-biting by the regulators and utilities who are the key players.

One underlying complaint going back 20 years is that the local utilities have dragged their collective feet in building new transmission or providing the technical/regulatory support to ease interconnection of the wind turbines to the existing transmission lines that are available.

A California Public Utilities Commission report from last December, "Electric Transmission Plan for Renewable Resources in California," was submitted to the state legislature, which in 2002 passed a law (S.B. 1078) directing the CPUC to "facilitate new transmission needed to develop renewable resources." The report deals with transmission issues in six specified areas, including the Tehachapis in parts of Kern and Los Angeles Counties.

The CPUC report called for an "orderly, rational and cost-effective" approach to transmission development tied to new renewable generation. It

echoed private-sector utilities' concerns about sunk costs if a "build it and they will come" approach is applied to transmission expansions. The CPUC report suggested a bid-based "trigger mechanism" in which the start of investment and new construction in transmission is linked directly to the timing for the building and interconnection of new generation. Earlier this month, California regulators directed Southern California Edison to begin construction of the first phase of a multi-phase transmission link to the Tehachapi area.

One well-known state wind developer said that either a 230-kV or 500-kV transmission addition to the Tehachapi region is needed. The transmission could be built incrementally as needed; one proposal is to begin with a 500-kV line, but only initially energize it to 230 kV.

Because the Tehachapi wind area is strategically located in the midst of a major north-south transmission crossroads, proponents of added utility-built transmission additions argue that overall benefits to the state's grid could be obtained by better interconnection between the northern end of Southern California Edison Co.'s service grid coming from the south and the southern end of Pacific Gas and Electric Co.'s grid sprawling to the north.

"PG&E needs renewable energy badly, and thus a direct route to them has advantages, and would complete a Path 26 (Vincent to Midway central valley) link, after a first step by Edison," said a Tehachapi wind industry stakeholder. The Los Angeles Department of Water and Power has a 230-kV (Owens Gorge-Rinaldi) line passing through Tehachapi, along with the DC Pacific Intertie, although it would be difficult to connect with the latter, the stakeholder noted.

Also in the mix is a 230-kV privately financed transmission line built in 1989 to take stranded wind power output of up to 320 MW to the Vincent substation on the existing north-south 500-kV line. Called the "Sagebrush Line," the transmission link was built with limitations, and it has not been capable of taking additional new load. Had the line been configured differently, industry experts say that millions of dollars that SoCal Edison paid in curtailment charges on the existing 66 kV line in Tehachapi would have been avoided.

Non-transmission alternatives and technology advances can lessen the need for costly added transmission to accommodate wind development, but they will not eliminate the need for the new transmission capacity.

Ultimately, economics and technology development can help fill the transmission gap between the market and new renewable generation, but a large amount of regulatory coordination is needed on both the state and federal levels. The CPUC has kick-started the process for the Tehachapi Mountains, but several legal and political steps are still needed to ultimately clear the way. ***[R.N.]***

More information:
Kern County Wind Energy Association (www.kwea.org)
California Public Utilities Commission (www.cpuc.ca.gov)

OPEN SESAME

11] Skateboards, LEDs and Transition

I watched a public television program on automobile development recently. The host was Alan Alda, an amiable if not especially knowledgeable actor and semi-public figure. The result amounted to Auto Transformation 101. The show featured Alda driving an assortment of electrics, diesels, biodiesels, hybrids, hydrogen fuel cells and hydrogen ICEs.

There was not much technical focus in the test drive chitchat. But the General Motors "skateboard" development was interesting indeed and worth discussing from a conceptual standpoint. Skateboard would mean radical revision of automotive design by building a flat framework for wheels, control electronics, general mechanics and power. The result looks like a skateboard.

The skateboard can be fitted with various superstructures for driver and passengers. It means that actual car production could break with Henry Ford's landmark assembly line model and become distributed. In other words, the skateboard, a foot-deep platform with four wheels on the corners, would package all automotive systems and would be delivered to automobile producers to create finished products.

The light-emitting diode is the next step, and it can be a lighting winner.

Although the program did not make the connection, this process would match well with Amory Lovins' Hypercar concept, which, in one of its versions, anticipated customized and even localized assembly of autos from delivered components, including fuel cell propulsion. The GM skateboard would utilize fuel cells.

The PBS program did not explore the main thrust of the Rocky Mountain Institute's Hypercar concept, which is the use of materials such as graphite composites that are at least an order of magnitude lighter and stronger that standard automotive metals. Lighter, of course, means better operating economics.

The skateboard concept promises changes in the automotive production business model, which means that nothing will happen overnight. In North America, there are dozens of choices among major automakers and their herd of brands and models. The result has been a load of distinctions with few, if any, real differences. We have all seen the ads for "new" four-door sedans with breathless declarations of distinction that simply do not exist, as the vehicles in question are practically indistinguishable from a dozen other four-door sedans.

But the separation of power and control platforms from accommodations and styling could expand a range of choices not now readily available or even available at all. The energy industry can benefit in this regard from advances in fuel cell design, fueling technologies and efficiency.

The transition period now under way largely with gas ICE hybrids is not moving with lightning speed, although we are promised lots of better products inside this decade. The capitalization costs of current hybrid development have not been all that great yet, but these will increase as competition increases.

The capitalization plus development costs of the skateboard concept are likely to be very high and transformation slow because the new concept would appear to be successful at the expense of the parent enterprise. But the increasing acceptance of hybrids, biodiesels and other newcomers such as hydrogen ICEs may change that expense equation.

The business model change in LEDs promises to be even more radical and also costly. Lighting is a huge factor in electric end-use, and a big fraction of that use involves a unique product with a special business model. The incandescent light bulb is the only appliance that traditionally wears out in a hurry.

Despite their distinguished history in transforming civilization, at least at night, incandescents are monuments to designed obsolescence. Although lighting companies have diversified a bit, the amount of money involved in making and selling bulbs with quick burn-out filaments is obscenely enormous.

Moreover, of course, the standard incandescent bulb uses electricity to generate 10 percent light and 90 percent heat—which is great for chicken brooders and not much else. The compact fluorescent bulb has become a major challenge that lighting companies have embraced, although the affection was not all that genuine for many years. But the compact fluorescent lamp business model still involves postponed obsolescence.

The light-emitting diode is the next step, and it can be a lighting winner. It produces brilliant light, generates no appreciable heat, uses very little electricity and lasts indefinitely. Years, for sure, maybe even decades.

It is a new technology for general lighting applications, and LEDs are at the moment not wholly ready for prime time. The Northwest Energy Efficiency Alliance a year ago published a 90-page report on LED market prospects. LEDs have been around for a long time as the points of colored light in electronic appliances. But LEDs as general lighting technology are newcomers, and troubles remain as reported by the Alliance. There are production, measurement, cost and system-design problems. Moreover, of course, you don't sell LED lighting hardware like you sell 750-hour light bulbs. You sell LED lighting like you sell lamps and lighting fixtures. Bulbs in the reading lamp and the kitchen fixture last, in effect, as long as the hardware.

So General Electric, Sylvania and others in the lamp manufacturing business, along with an enormous wholesale and retail establishment, are faced with big problems. Companies with major economic stakes in a profitable status quo are less than enthusiastic about a leapfrog technology that looks like it's going to take over the home pond, so to speak.

Their feelings may not be all that different from those of the horse establishment as the automobile dynamic took off a hundred years ago. Unfamiliarity will help the transition. The Alliance report says, "This unfamiliarity applies equally for users at all experience levels: lighting designers, residential and commercial users, installers, building inspectors and government code officials. Most lighting designers are used to thinking, designing and working with white light sources instead of colored light sources. They are also not accustomed to taking advantage of the energy-efficiency, long-life and maintenance characteristics of LEDs."

Both skateboard hybrids and LED technologies offer challenging and important improvements in the energy environment that need strong support, perhaps including legislation at least for LEDs. Government development investments are a chancy crapshoot. But with the current flap over higher-end domestic job loss through overseas outsourcing, it might be worthwhile to do some proactive planning and get selected job development support in place even as the LED transition gathers steam. ***[Cyrus Noë]***

PROSPECTORS

12] Wind Power Looks Better and Better

The current wind power industry is light years away from the one that Hal Romanowitz discovered almost 20 years ago when he bought a turbine in California's Tehachapi Mountains as a tax shelter. Romanowitz, president and COO of wind operator Oak Creek Energy Systems and head of the Kern (County) Wind Energy Association (KWEA), finds that today's advanced business practices and new technologies make wind power facilities more like conventional power plants.

In 1985, wind technology was fairly unreliable, and was fighting against obstacles like economics, physics and regulatory disdain. By mid-1986, Romanowitz recalls, the federal investment tax credit for wind power was eliminated, and the industry was "in serious trouble."

Romanowitz believes that technically and economically feasible wind storage that could remedy many current grid problems is "not far off."

Today, Romanowitz is active on all government levels seeking regulatory policies that will allow wind to realize its heightened potential. He thinks the industry is making progress on the issues of "storage, or firming of energy delivery." Romanowitz believes that technically and economically feasible wind storage that could remedy many current grid problems is "not far off."

Most of the technology challenges that haunted wind in its earlier stages of development now are being addressed and economies of scale have begun to kick in, particularly in growing global markets. But Romanowitz must continually address regulatory and utility concerns about how wind facilities literally fit into the grid. In a recent action earlier this month, for example, California regulators mandated that Southern California Edison Co. build the first

phase of a multi-phase transmission line system to the wind-rich Tehachapi area in Kern County.

In the Tehachapi Mountains and other areas with high wind potential, today's wind turbines can perform "to a very high standard," says Romanowitz. "The scale of manufacturing has increased dramatically, lowering costs to the point where wind energy approaches the cost of any other generation technology," he notes. "Business practices have developed in the wind farm model where arrays of turbines are organized and controlled similar to a conventional power plant."

The challenge is for wind to become what Romanowitz calls "very transmission grid-friendly—as friendly as a natural gas-fired power plant." He thinks the technology is presently on the verge of doing this at "modest cost." The wind industry has submitted a national standard to the Federal Energy Regulatory Commission to accomplish this goal.

"It is critical that grid operators and regulators establish protocols to encourage and facilitate forecasting of wind energy production days ahead and in near-real-time, as well as effectively integrating wind with other generation technologies for the most effective combination of generation technologies for firm deliveries," says Romanowitz. When these new processes and protocols are "effectively implemented," he adds, gas-fired generation could be dispatched secondarily to wind and other renewables as a means of husbanding North America's dwindling natural gas reserves.

Romanowitz's faith in wind power has already paid off. In the late 1980s, he was a trustee in the Chapter 11 bankruptcy reorganization of Oak Creek Energy Systems, at a time when general industry opinion held that the company could not be salvaged. But Romanowitz assembled a team and successfully turned the company around. He left the company eventually, but returned in the late 1990s to lead a massive re-powering of its 600-kW and 700-kW turbines. Since that time, the company has "progressively strengthened," he says. Oak Creek is now likely to re-power the remaining turbines in its Tehachapi area fleet on a joint-venture basis.

"Energy storage will likely emerge as an economic technology to firm wind energy and other intermittent resources, and it will effectively place renewable generation in optimum locations on the grid," Romanowitz says. ***[R.N.]***

More information:
Oak Creek Energy Systems (www.oakcreekenergy.com)
Kern County Wind Energy Association (www.kwea.org)

13] From the Glacier to the Farm, Northern Adapts Turbine

Distributed Energy Systems Corp. subsidiary Northern Power Systems is converting a wind turbine it developed for extreme cold weather environments into a commercially available low-wind-speed turbine under a $2 million cooperative agreement with the U.S. Department of Energy and GE Energy's Wind Energy segment and Global Research Center.

The 100-kW "NorthWind 100" uses Northern's variable-speed, direct-drive technology and was originally developed with DOE, NASA and the National Science Foundation to operate in polar environments as cold as minus 50 degrees F, with a focus on high reliability and low maintenance. The special drive train has fewer moving parts and improves power quality on small or isolated grids and in distributed energy applications. Northern recognized that the basic design would work well in other applications and markets, but its cold weather considerations kept production volumes low and costs high.

The new effort aims to produce and test a prototype that relies less on those considerations by eliminating special materials, increasing rotor diameter and tower height, and rearranging the drive train and nacelle layouts to make manufacturing more efficient. The effort is targeted at commercial development for the low- and moderate-wind-speed markets, specifically the U.S. agricultural market, as well as new and emerging markets that could open up as the price comes down. Northern plans to test the prototype late next year and in early 2006, with commercial deployment to follow. GE is participating as a design partner.

Northern's variable-speed, direct-drive technology is also being employed in the development of 1.5-MW and 2-MW low-wind-speed turbines under a DOE effort to reduce prices at low-wind sites to 3 cents per kWh [see **DOE Wind Research Aims to Open Siting Frontiers**, April 9, 2004]. ***[B.G.]***

More information:
Northern Power Systems (www.northernpower.com)

14] Dynetek's 'Virtual Pipeline' Approved in U.S., Canada

Calgary, Alberta-based Dynetek Industries Ltd. announced last week that both the U.S. Department of Transportation and Transport Canada have approved its lightweight DyneCell cylinders for hauling bulk quantities of compressed gases using tube trailers. The company claims that its composite cylinders—the first to gain regulatory approval from both countries—are approximately one-quarter the weight of steel cylinders and can store up to 80 percent more compressed gas on board, including CNG and hydrogen.

The cylinders' light weight and high storage capacity will allow for economic transport of CNG.

Dynetek President and CEO Robb Thompson called the cylinders "virtual pipelines," and told *Prospects* that the cylinders' light weight and high storage capacity will allow for economic transport of CNG from orphaned natural gas reserves or regions of low production where it remains too costly to install a pipeline. He added that the company's cylinders would not be impeded by barriers such as road bans that in many areas prevent

transport of CNG in conventional steel tube trailers due to their excessive weight.

The DyneCell cylinders will also "play a significant role in providing and overcoming the hydrogen infrastructure requirements for the future," according to Dynetek. Thompson said the cylinders will substantially expand the company's role in supplying hydrogen for refueling stationary fuel cell units for electric generation, as well as portable fuel cell units for automotive transportation. ***[J.P.]***

More information:
Dynetek (www.dynetek.com)

15] Duke, Sempra Developing New Gas Storage Projects

Duke Energy Gas Transmission will add a third 8-billion-cubic-foot natural gas salt dome storage cavern to its Market Hub Partners' Egan facility in Acadia Parish, La., increasing the capacity of the facility to 24 bcf, the company announced this month. Seven interstate pipelines access the storage facility, and Duke expects to complete the project in 2006.

Increased storage capacity is seen by some industry analysts as an important way to mitigate price spikes and seasonal shortages, and align LNG import schedules with demand patterns. According to a recent Merrill Lynch research report, the industry will need 150 bcf to 250 bcf of additional storage capacity for every trillion cubic feet of LNG import capacity that is added. That translates to $1.5 billion to $2.5 billion in annual storage investment over the next several years as part of the annual $5 billion to $10 billion in overall downstream investments needed [see **Natural Gas Crunch Reaches Beyond Sources of Supply**, June 4, 2004]. According to the report, Duke is one of just a handful of companies with enough market capitalization left after the energy crisis to undertake the necessary projects.

Duke is one of just a handful of companies with enough market capitalization left after the energy crisis to undertake the necessary projects.

Also last month, Sempra Energy Global Enterprises invited gas shippers to bid for new capacity at its Pine Prairie Energy Center, a new salt-cavern storage facility in Evangeline Parish, La., which is expected to come online late next year. The facility will include three salt caverns totaling 24 bcf of capacity and will be able to receive 1.2 bcf/d and inject 2.4 bcf/d into the market. Sempra is also in the final stages of completing its 27-bcf Bluewater Gas Storage facility in St. Clair, Mich. ***[B.G.]***

More information:
Duke Energy Gas Transmission (www.duke-energy.com/businesses/companies/degt.asp)
Sempra (www.sempra.com)

16] Evaporative Cooling Can Shave Peak Demand in SW

It's time to launch a marketing blitz to convince consumers in hot climates to use energy-efficient evaporative coolers instead of conventional air-conditioning systems, says the Southwest Energy Efficiency Project (SWEEP) in a report prepared for the U.S. Department of Energy's Building America Program and released last month.

Between 2000 and 2020, there will be 2.9 million new housing units built in the Southwest, and if 40 percent of them installed such coolers, demand in the region would drop by 2,945 MW by 2020, with energy savings of about $338 million. The Southwest's climate is ideally suited for evaporative cooling because of its low humidity and large diurnal temperature swings, according to SWEEP.

Even though evaporative cooling systems are five times more efficient than central air conditioning (CAC) systems in terms of Btu of cooling per kWh, and use about one-quarter less electricity, the market trend in both new home construction and residential retrofit is strongly toward CAC, SWEEP says. This is largely because builders, HVAC contractors and the general public either don't know about or have a distorted view of evaporative coolers.

Today's evaporative cooler is not your grandfather's "swamp cooler," in which a fan blew hot outside air through pads made of wet aspen fibers. New models use plastic-coated cellulose cooling pads that filter and clean the incoming air themselves while maximizing cooling effectiveness. Evaporative coolers do require extra water to operate (about 3 percent of average residential water use), but SWEEP argues that fact is offset by the amount of water central power stations won't have to use for cooling. "From an overall environmental point of view in the Southwest, evaporative coolers use less fossil fuels with only a slight increase in water use relative to even the most efficient CAC systems."

More and better utility incentive programs top the list of SWEEP's recommendations to increase the use of evaporative coolers in the region. Pacific Gas and Electric and Southern California Edison pay homeowners $300 to $500 to install evaporative coolers. Xcel Energy in Colorado is working with retailers such as Home Depot and Sears to achieve 1,300 installations at up to $250 each in 2004. Xcel projects 300 kW of summer peak demand savings and 269 MWh of net annual energy savings as a result. ***[Susan Whittington]***

More information:
Southwest Energy Efficiency Project (www.swenergy.org)

17] E2I Advances Study of Wave Power Potential, Devices

The Electricity Innovation Institute (E2I) and the Electric Power Research Institute (EPRI) in May and June completed their assessments of potential wave energy sites in Oregon, Washington, Hawaii, and Maine, and the technologies that could potentially convert wave motion into energy.

In cooperation with state energy agencies, utilities and the National Renewable Energy Laboratory, E2I and EPRI are creating a conceptual design for a 500-kW pilot demonstration plant and a 100-MW commercial-scale facility at one site in each state.

According to E2I, the effort will help determine whether wave energy is economically viable off U.S. shores by about 2010, and make a case either for or against additional demonstration funding for wave energy conversion technology. Several developers, some of whom are already initiating pilot projects, have stated that this is within their reach.

At present, ocean energy is not recognized as a renewable energy resource by the federal government. Provisions in the stalled comprehensive energy legislation would correct that, paving the way to federal funding.

E2I believes that only one of eight devices reviewed in its assessment is ready for selection by state energy advisors for a pilot plant: Ocean Power Delivery's Pelamis. Three companies—Energetech, Wave Dragon and Teamwork—have devices that would require few remaining technical issues to be resolved, according to E2I. Four companies—AquaEnergy, Independent Natural Resources, OreCon and WaveBob—have devices that have conquered most critical R&D issues, but remaining concerns must still be addressed for pilot projects. ***[G.H.]***

More information:
E2I wave power program
(www.e2i.org/e2i/wavepower/wavepower.html)

18] LADWP Outlines Initial Plan For 20% RPS by 2017

Mirroring an initial path-finding standard for California's private-sector utilities, the Los Angeles Department of Water and Power provided a city council energy committee earlier this month with a conceptual draft framework for a renewable portfolio standard of 20 percent by 2017, without "compromising" its system reliability.

Complementing this utility effort, Los Angeles Mayor James Hahn reportedly will create a "green ribbon committee" to further move the city-run utility away from increased reliance on coal and natural gas-fired generation.

LADWP has committed to developing and buying power from small hydro, solar, wind, biomass, fuel cells and other sources, but only based on a "least-cost and best-fit technology" basis. Elected officials with veto power over the program say they will not tolerate anything that has a major financial impact on small residential customers.

With suggested pricing caps overall and annually, LADWP proposes to establish an internal "services risk policy committee" that will assess the renewable technologies based on strict economic and financial criteria. The committee will make initial recommendations for accepting RFPs, subject to concurrence from its oversight board, the mayor and city council.

Initial contracts are not anticipated before February 2005, but LADWP has outlined a long list of steps it must go through to make the 20-percent RPS a reality. For example, before a formal plan and program are approved, LADWP intends to go through a comprehensive RFP, third-party review and stakeholder-feedback process. The utility hopes to have a program approved by the city council in January 2005 and to begin awarding contracts shortly thereafter.

LADWP officials also suggested that the utility proceed with releasing RFPs later this month from renewable power providers in the wind, solar and biomass sectors to develop a preliminary analysis of the mix and the cost of various green power sources by October. After the utility obtains citizen input through public meetings, it would submit a final set of potential contracts to the LADWP oversight board and the city council early next year.

At this early stage, no one is satisfied with the status quo, in which LADWP presently gets only 2.2 percent of its electricity supplies from renewables, including solar, wind, geothermal and biomass. However, the utility said that new programs and longer-term commitments push the figure closer to 5 percent after 2005. ***[R.N.]***

More information:
Los Angeles Department of Water and Power
(www.ladwp.com)

19] Seven States Expand Carbon Sequestration Effort

Seven states and a host of electric utilities, universities and private institutes in mid-June joined the Department of Energy's Carbon Sequestration Regional Partnership Program, an effort to validate and deploy technologies to capture and store carbon in geological formations in various parts of the United States.

This first $20 million phase of the effort is focused on identifying technologies and locations to be recommended for small-scale validation testing in a second phase.

Virginia and Texas, the latter already a member of the Southwest sequestration team, joined the Southeast team, focused on carbon capture and sequestration in the Gulf Coast. Nebraska, Iowa, Missouri, and Wisconsin joined the Plains team, while Michigan and Maryland expanded the effort in the Midwest. The partnerships now include 154 organizations in 40 states, three American Indian nations, and two Canadian provinces.

According to DOE, this first $20 million phase of the effort is focused on identifying technologies and locations to be recommended for small-scale validation testing in a second phase, to begin in late fiscal year 2005.

That will greatly increase the small number of carbon capture and storage projects now under way. Currently, carbon dioxide from the Great Plains Coal Gasification Plant in North Dakota is being injected into an oil field as a part of the Weyburn oil recovery project in Saskatchewan, Canada. In Europe, Norway's Statoil has sequestered carbon dioxide underneath the North Sea for several years.

"Sequestration is difficult, but if we don't have sequestration then I see very little hope for the world," said new Shell Chairman Ron Oxburgh in a June 17 interview with *The Guardian* newspaper of London. "No one can be comfortable at the prospect of continuing to pump out the amounts of carbon dioxide that we are pumping out at present ... with consequences that we really can't predict but are probably not good." ***[G.H.]***

More information:
DOE press release (www.doe.gov/engine/content.do?PUBLIC_ID=16011&BT_CODE=PR_PRESSRELEASES&TT_CODE=PRESSRELEASE)
Guardian interview with Ron Oxburgh (www.guardian.co.uk/print/0,3858,4949299-103690,00.html)

20] Low-Speed Turbines to Open Up New Areas for Wind

At a rated wind speed of 18 miles per hour, Canadian wind turbine developer WestTech Energy's suite of small-scale, low-speed turbines now under development have the potential to open up vast new areas previously considered unsuitable for wind power. Rated wind speeds for horizontal axis turbines are usually in the 27 mph range.

According to WestTech Energy President and Chief Executive Officer Richard West, the company currently is seeking some C$4 million in investment to commercialize a 3-kW lightweight carbon fiber, vertical-axis wind turbine for residential markets; a 10-kW horizontal-axis turbine for small businesses, ranches, farms or remote areas; and a 3-kW aluminum-head model. Engineering for the systems is about 85 percent complete, said West.

WestTech is developing "net-meterable" horizontal axis wind turbines in the 500-watt, 1-kW, 3-kW and 10-kW ranges.

WestTech is developing "net-meterable" horizontal axis wind turbines in the 500-watt, 1-kW, 3-kW and 10-kW ranges, and estimates generator designs to be 30 percent to 40 percent more efficient than competitors.

The Kelowna, British Columbia, company recently was selected as one of 12 new energy companies in the Pacific Northwest and Western Canada to present its technology at the Northwest Energy Technology Collaborative's Northwest Energy Technology Showcase in Victoria on July 13. ***[G.H.]***

More information:
Northwest Energy Technology Collaborative (www.nwetc.com)
WestTech Energy (www.westtechenergy.ca)

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